

WHAT IS CLAIMED IS:

1. A vehicle front and rear wheels drive system having a speed-changeable change-speed apparatus disposed along a power transmission path extending from 5 primary drive wheels to secondary drive wheels, said change-speed apparatus having a composite planetary gear device provided in a casing fixed to a vehicle body, comprising:

changeover clutch discs for, respectively, a direct 10 coupling clutch and a change-speed clutch disposed on a movable element provided concentrically with an input shaft or an output shaft of said change-speed apparatus, to which power is transmitted from said primary drive 15 wheels, said movable element being adapted to move along an axial direction of said input shaft or said output shaft and meshing with a carrier of said composite planetary gear device in such a manner as not to rotate relative to said carrier; and

an elastic body and an actuator both for changing 20 over a state between engagement and disengagement of said direct coupling clutch or said change-speed clutch, said elastic body and said actuator being disposed such that operating directions of said elastic body and said actuator are opposed to each other in the axial direction; 25 wherein said elastic body brings one of said direct coupling clutch and said change-speed clutch into engagement by moving said movable element by virtue of

a biasing force thereof, and

5        said actuator changes over the engagement of said clutches from the engagement of said one clutch to the engagement of the other clutch by moving said movable element against the biasing force of said elastic body by virtue of a thrust of the actuator.

2.        The vehicle front and rear wheels drive system according to claim 1, wherein said actuator releases the 10 engagement of said one clutch by moving said movable element against the biasing force of said elastic body while moving a clutch disc of said other clutch by virtue of the thrust of the actuator so as to bring said clutch disc of said other clutch into engagement with said 15 changeover clutch disc disposed on said movable element.

3.        The vehicle front and rear wheels drive system according to claim 1, wherein said actuator brings said 20 other clutch into engagement after having released the engagement of said one clutch by moving said movable element against the biasing force of said elastic body by virtue of the thrust of the actuator.

4.        The vehicle front and rear wheels drive system 25 according to claim 1, wherein said changeover clutch discs, respectively, for said direct coupling clutch and said change-speed clutch are disposed in two stages in a radial

direction across said movable element, and  
wherein said changeover clutch disc situated on an  
inner circumferential side engages with a clutch disc  
disposed on either said input shaft or said output shaft,  
5 while said changeover clutch disc disposed on an outer  
circumferential side engages with a clutch disc disposed  
on said casing.

5. A clutch changeover method for changing over  
10 clutches in a change-speed apparatus having a direct  
coupling clutch and a change-speed clutch which are  
disposed on a movable element provided concentrically  
with an input shaft or an output shaft to which power  
is transmitted, said movable element being adapted to  
15 move along an axial direction of said input shaft or said  
output shaft, and an elastic body and an actuator both  
for changing over a state between engagement and  
disengagement of said direct coupling clutch or said  
change-speed clutch, said elastic body and said actuator  
20 being disposed such that operating directions of said  
elastic body and said actuator are opposed to each other  
in the axial direction, said clutch changeover method  
comprising the steps of:

keeping one of said direct coupling clutch and said  
25 change-speed clutch in engagement by normally moving said  
movable element in one direction by virtue of a biasing  
force of said elastic body; and

changing over the engagement of said clutches from said one clutch to the other clutch by moving said movable element against the biasing force of said elastic body by activating said actuator.

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6.. The clutch changeover method according to claim 5, wherein one of said direct coupling clutch and said change-speed clutch is kept in engagement by normally moving said movable element in one direction by virtue 10 of a biasing force of said elastic body, and

wherein the engagement of said one clutch is released by moving said movable element against the biasing force of said elastic body while bringing the other clutch into engagement by activating said actuator..

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7.. The clutch changeover method according to claim 5, wherein one of said direct coupling clutch and said change-speed clutch is kept in engagement by normally moving said movable element in one direction by virtue 20 of a biasing force of said elastic body, and

wherein said other clutch is brought into engagement after the engagement of said one clutch has been released by moving said movable element in the other direction against the biasing force of said elastic body by actuating 25 said actuator.